

**Methods** 28 subjects with chronic cough and 21 healthy subjects underwent measurement of oesophageal pressure (Poes), gastric pressure (Pga), peak abdominal electromyographic activity (EMGabd) and peak cough flow rate (PCFR) during 10 maximum voluntary cough manoeuvres. Coughs were performed at functional residual capacity. Inspiratory volume (IV) preceding cough efforts was calculated by integration of flow. Expiratory muscle strength was assessed by measuring twitch gastric pressure (TwPga) in response to magnetic stimulation. EMGabd data was normalised to EMGabd twitch compound muscle action potential and PCFR data normalised to predicted peak flow rate (PEFRp). The analysis of data was restricted to gender and expressed per unit IV.

**Results** Subjects were matched for age, gender, BMI and had normal lung function. All measures of cough intensity were significantly higher in chronic cough compared to healthy controls, irrespective of gender (Table 1). However, this was not due to increased activation of the abdominal muscles since there were no significant differences in EMG ( $p>0.2$ ) or due to increased expiratory muscle strength ( $p>0.36$ ). There was no significant difference in Poes/IV and Pga/IV between male and female patients or controls ( $p>0.28$ ), but female cough subjects produced significantly higher PCFR/IV compared to males ( $p<0.01$ ).

**Conclusions** Cough intensity is increased in patients with chronic cough, during MVC. This raises the possibility that cough intensity in these patients may contribute to cough severity and health status. The mechanism is unclear and deserves further investigation in studies of VC and spontaneous cough.

**Abstract P160 Table 1** Maximum cough intensity during voluntary cough per unit inspired lung volume

|                           | Females |           |         | Males     |           |         |
|---------------------------|---------|-----------|---------|-----------|-----------|---------|
|                           | Cough   | Controls  | P-value | Cough     | Controls  | P-value |
| Poes (cmH <sub>2</sub> O) | 110±51  | 72±23     | 0.02    | 138±69    | 80±27     | 0.02    |
| Pga (cmH <sub>2</sub> O)  | 126±30  | 82±27     | <0.01   | 162±82    | 93±29     | 0.04    |
| PCFR:PEFRp ratio          | 1.2±0.9 | 0.78±0.39 | <0.01   | 0.94±0.22 | 0.70±0.15 | 0.02    |

Data presented as mean±SD IV: inspiratory volume; Poes: oesophageal pressure; Pga: gastric pressure; PCFR: peak cough flow rate; PEFRp: predicted peak cough flow rate.

**P161 COUGH INTENSITY IN VOLUNTARY, INDUCED AND SPONTANEOUS COUGH**

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**Introduction** Cough intensity is an important determinant of cough severity. We set out to investigate and compare the physiological characteristics and intensity of voluntary (VC), induced (IC) and spontaneous cough (SC) in subjects with chronic cough.

**Methods** 28 subjects with chronic cough (17 female, mean age 57 years) underwent measurement of oesophageal pressure (Poes), gastric pressure (Pga), normalised peak cough flow rate (PCFR) and peak abdominal electromyographic activity (EMG) were measured during (1) maximum VC (MVC), (2) capsaicin IC (2 doses: C<sub>5</sub> and supra-C<sub>5</sub>; 1<sup>st</sup> effort in a bout) and (3) SC (mean of 1<sup>st</sup> efforts of all bouts), in a subset of patients (n=9). Cough efforts were categorised as bouts or single events and as true cough or expiratory reflex (ER: absence of preparatory inspiration).

**Results** MVC by definition was always a single effort and all efforts were true coughs; no subject initiated an ER during MVC manoeuvres. The majority of efforts in IC (C<sub>5</sub>) and SC occurred within coughing bouts. ERs were the most frequent type of efforts in both IC and SC, 61–67% of all efforts, but accounted for only one third of the initial efforts of bouts in both IC and SC; true cough was the most frequent 1<sup>st</sup> effort (Table 1). Cough intensity was greatest in MVC for all measures. Poes, Pga and EMGabd were similar for IC and SC, and were approximately 60–70% of MVC intensity. PCFR:PEFRp however, was significantly higher in SC compared to IC. The analysis was similar for supra-C<sub>5</sub> stimulus with capsaicin. When restricted to the subgroup that underwent studies of all cough models (VC, IC and SC), the analysis was also similar.

**Conclusions** This is the first study of the physiology of cough in patients with chronic cough and spontaneous cough. MVC produces the most intense cough. The type of cough effort in IC and SC is similar but there were important differences in cough intensity (flow). The reason for this and its implications for the induced cough model are unclear and warrant further investigation.

## Lung cancer epidemiology, presentation and survival

**P162 WHEN DO PATIENTS WITH KNOWN LUNG CANCER PRESENT TO EMERGENCY SERVICES?**

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**Introduction** Use of electronic patient alerts systems are encouraged by government initiatives, especially within the realms of oncology, as a way of expediting relevant clinical review of oncology patients. When a known cancer patient attends an emergency unit,

**Abstract P161 Table 1** The physiological characteristics of cough in patients with chronic cough

|                                | MVC       | IC        | SC        | ANOVA p-value | IC vs SC p-value |
|--------------------------------|-----------|-----------|-----------|---------------|------------------|
| Type of cough effort           | N/A       | 91±14     | 82±19     | N/A           | 0.04*            |
| Efforts occurring in bouts (%) |           |           |           |               |                  |
| ERs (% of all efforts)         | 0         | 67±14     | 61±19     | N/A           | 0.40             |
| ER was 1st effort in bout (%)  | N/A       | 25±28     | 27±22     | N/A           | 0.49             |
| Cough intensity                |           |           |           |               |                  |
| Poes (cmH <sub>2</sub> O)      | 179±45    | 112±61    | 128±28    | <0.001*       | 0.42             |
| Pgas (cmH <sub>2</sub> O)      | 194±59    | 116±68    | 141±43    | <0.001*       | 0.36             |
| EMGabd                         | 0.14±0.11 | 0.09±0.07 | 0.07±0.07 | 0.05          | 0.57             |
| PCFR:PEFRp ratio               | 1.52±0.38 | 0.38±0.12 | 0.82±0.32 | <0.001*       | <0.001*          |

Data presented as mean±SD MVC: maximum voluntary cough; IC: induced cough; SC: spontaneous cough; ER: expiratory reflex; Poes: oesophageal pressure; Pga: gastric pressure; EMGabd: peak abdominal electromyographic activity; PCFR: peak cough flow rate; PEFRp: predicted peak expiratory flow rate.